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ABSTRACT

This module on administering eye medications is intended for use in inservice or continuing education programs for persons who administer medications in long-term care facilities. Instructor information, including teaching suggestions, and a listing of recommended audiovisual materials and their sources appear first. A brief discussion follows of gross anatomy of the eye, proper technique for administering eye medications, and information about commonly used ophthalmic medications, their uses, actions, and interactions. This discussion is intended for use as a lecture or participant reading. Other contents include diagrams of eye medication administration and a medication chart, both of which are suitable for reproduction for use as handouts. (YLB)

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ADMINISTERING EYE MEDICATIONS

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Administering Eye Medications

Instructor Information

This material is intended for use in inservice or continuing education for persons who administer medications in long term care facilities. It includes:

- A review of gross anatomy of the eye
- A review of technique for administering eye medications which could be discussed and demonstrated
- Information about commonly used ophthalmic medications, their uses, actions, and interactions

These items may all be copied at your discretion for distribution to participants. You might also wish to include information about your facility policies for storage, reordering, charting, etc.

Administering Eye Medications

Goal

Administration of eye medications is a common responsibility of medications personnel in long term care facilities. This module presents a review of proper technique for this procedure and a review of frequently used ophthalmic medications.

Objectives

After completing this module, participants will be able to:

- Use proper technique in administering eye drops and eye ointment
- Recall 5 classifications of ophthalmic medications with one example of each
- Describe adverse reactions to eye medications which should be recorded and reported

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General Information

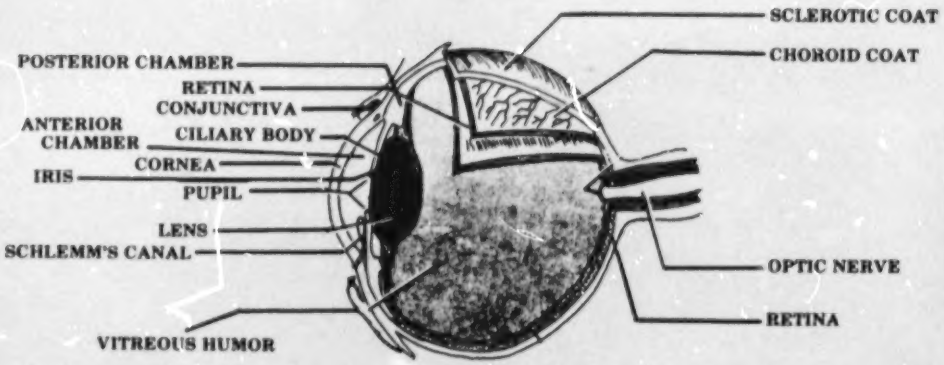
Review of Anatomy and Physiology

The eyeball is a hollow sphere consisting of three layers of tissue. The outer layer is the tough, white, fibrous protective coat called the sclera. The anterior part of the sclera is transparent so that light rays can enter the eye. The transparent part is called the cornea. The middle coat is the choroid. It contains many blood vessels. Muscles and ligaments which hold the lens in place originate in the middle coat. The iris (the colored part of the eye) is also a part of the middle layer. The muscle of the iris controls constriction and dilation of the pupil which is a hole in the center of the iris. The inner coat of the eye is the retina. It has no anterior portion. The retina contains nerve cells which are sensitive to light rays. Light rays come in through the pupil and are focused by the lens on the nerve cells of the retina. Messages are then carried from the nerve cells through the optic nerve to the brain where they are interpreted.

The large hollow portion of the eyeball is called the vitreous chamber and is filled with a jelly-like substance called vitreous humor. This keeps the eyeball from collapsing. The smaller hollow portion in front of the lens is filled with aqueous humor, a clear watery substance. The aqueous humor prevents contact between the cornea and the iris.

The eyeball is protected by the bony structures around it. It is kept moist by tears which are produced by the lacrimal glands at the upper, outer side of each eye. Tears drain from the eye through the lacrimal ducts in the inner corner into the nose. The eyelids, eyelashes, and eyebrows are also part of the protective system.

EYE



LACRIMAL APPARATUS

Commonly Used Eye Medications

Miotics constrict the pupil. They are used in the treatment of glaucoma, a disease which causes increased pressure in the eyeball due to an interference with drainage of aqueous humor. Aqueous humor is normally produced by the ciliary body, circulates from the posterior chamber to the anterior chamber, and drains through the Canal of Schlemam, keeping the pressure within the eye constant. In glaucoma aqueous humor continues to be produced, but fluid is not adequately drained from the eye due to blockage by the iris or tissue changes in the outflow channel. Miotics are given to the patient with glaucoma because constriction of the pupil allows more room for circulation and drainage of the aqueous humor.

Carbonic Anhydrase Inhibitors are oral medications which are used to decrease the production of aqueous fluid for the person with glaucoma.

Mydriatics dilate the pupil. They are used prior to an eye examination to enlarge the pupil so that structures in the back of the eye can be examined more easily. Eyes may be very sensitive to light for several hours after mydriatics are administered; wearing dark glasses will help.

Anti-infective ophthalmic medications are administered for eye infections such as:

- Conjunctivitis (pinkeye)—inflammation of the membrane which lines the eyelid and covers the front of the eye except the cornea
- Keratitis—inflammation of the cornea
- Hordeolum (sty)—infection of the edge of the eyelid which begins in an eyelash follicle

Sometimes antibiotic, anti-inflammatory combination drugs are used.

Artificial tears and **eye irrigants** lubricate and protect eyes from infection when normal tear production is not adequate. They are often used for minor irritations to soothe burning and pain.

Review of Procedure for Administering Eye Medications

Liquid Medications

1. Always wash hands just before administering eye medications.
2. Verify the order with the information on the medication label. *Be sure the medication is ophthalmic.*
3. Explain to the patient what you are going to do.
4. Position the patient with head tilted back and slightly to the side with the unaffected eye uppermost.
5. With one hand pull down the lower lid to form a little pouch and ask the patient to look up.
6. Hold the dropper in your other hand and rest this hand on the patient's forehead as a safety measure.
7. Squeeze the dropper or bottle and instill the proper dosage of medication in the pouch formed by the lower lid—never on the eyeball itself.
8. Close the eye gently and wipe away any medication that was spilled on the face.
9. To reduce systemic absorption, press your finger on the inner canthus of the eye for one or two minutes.
10. Wash your hands carefully when you finish.

Ointments

1. Wash hands carefully.
2. Verify the order—*be sure the medication is ophthalmic.*
3. Explain to the patient.
4. Position the patient with head tilted back and slightly toward the affected side.
5. Cleanse the eyelid and lashes with a gauze sponge moistened with saline or irrigating solution.
6. With one hand, pull out the lower lid and ask the patient to look up.
7. Squeeze a small ribbon of medication along the inside of the lower lid.
8. Ask the patient to keep the eye closed for 1 or 2 minutes.
9. With a gauze or tissue, wipe the outside of the lids gently.

Administering Eye Medications

Points to Remember

Only *ophthalmic* medications should be used in the eye

- otic means ear
- topical means skin

Cleanliness is important

- wash hands before and after administering
- advise patient to use own washcloth and towel—no one else's
- each person must have own bottle or tube of eye medication—no sharing!

Safety is important

- brace your hand against the patient's forehead when administering eyedrops
- avoid touching the eye or surrounding tissues with dropper or tube

Medication must be stored properly

- keep tightly covered
- protect from excess heat and light
- check expiration date before using

Follow the order—don't forget!

- medication must be given at times ordered—particularly miotics for the person with glaucoma
- check carefully to be sure you are following the five rights

Watch for undesirable effects of eye medications

- look for redness, swelling
- listen for complaints of blurred vision, itching, burning, pain

Remember to chart what you did and observed.

ADMINISTERING EYE MEDICATIONS

Liquid Medications (Drops)

REMEMBER: SQUEEZE THE DROPPER OR BOTTLE AND INSTILL THE PROPER DOSAGE OF MEDICATION IN THE POUCH FORMED BY THE LOWER LID--NEVER ON THE EYEBALL ITSELF.

PRESS YOUR FINGER ON THE INNER CANTHUS IN ORDER TO REDUCE SYSTEMIC ABSORBTION

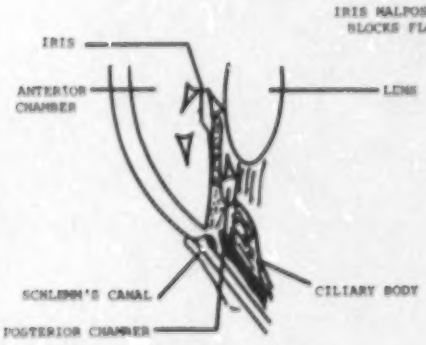
Ointments

REMEMBER: CLEANSE EYELID AND LASHES WITH SALINE OR IRRIGATING SOLUTION

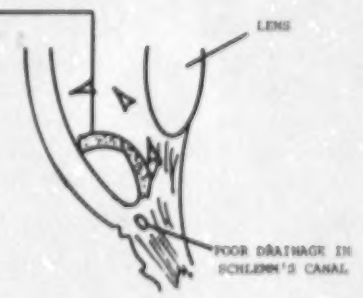
SQUEEZE A SMALL RIBBON OF MEDICATION ALONG THE INSIDE OF THE LOWER LID.

ASK THE PATIENT TO KEEP THE EYE CLOSED FOR TWO MINUTES.

FLOW OF AQUEOUS



NORMAL EYE



GLAUCOMA

Medications Used in Treatment of Glaucoma

Drug	Side Effects	Interacts With	To Produce	Remember
Miotics Constrict the Pupil **Pilocarpine HCL** Isopto Carpine Pilocar Absorbocarpine	Tachycardia Headache Blurred vision Nausea Vomiting Irritation of conjunctiva Hypersensitivity	**Carbachol**	Additive effect	Do not exceed recommended dosage Do not touch dropper to eye or surrounding tissue Glaucoma therapy is long term—maintaining treatment as ordered is very important
		Phenylephrine	Decreased dilation	
Carbachol Carbacel Isopto Carbachol	Headache Conjunctival Vasodilation Sweating Flushing	None significant		
Miotic Combinations Constrict the Pupil **P8E1** (contains 8% pilocarpine and 1% epinephrin—other strengths available)	Tachycardia Palpitations Headache	None significant		
Carbonic Anhydrase Inhibitors Decrease Production of Aqueous Fluid **Acetazolamide** Diamox (given orally)	Drowsiness Weakness Headache Vertigo Nausea Diarrhea Polyuria Itching Rash Tinnitus Hypotension	None significant		Depletes body of potassium Potassium rich diet indicated (orange juice, bananas) Watch for excessive diuresis

Eye Medications

Drug	Side Effects	Interacts With	To Produce	Remember
Mydriatics Dilate the Pupil	Increased intraocular pressure Blurred vision Flushing	None significant		Have patient wear dark glasses to decrease photophobia Do not touch dropper to eye or surrounding tissue Do not exceed recommended dosage
Atropine sulfate Atropisol BufOpto Atropine				
Epinephrine Epifrin Epinal	Conjunctivitis Rash Severe stinging Palpitations Tachycardia	**Tricyclic antidepressants** Norpramin Elavil Sinequan	Potentiate cardiac effects of epinephrine	Protect from heat and light Don't use darkened solution Do not touch dropper to eye or surrounding tissue
		Antihistamines Benedryl Dimetane Phenergan Temaril	Potentiate cardiac effects of epinephrine	
Artificial Tears and Eye Irrigants Protect and Soothe	Burning Blurred vision Crust formation on eyelashes	Borate external irrigation solutions	Crust on lashes and lids	Do not touch dropper to eye or surrounding tissue
Artificial Tears Tears Naturale Isopto Tears Liquifilm Tears Ultra Tears				
Eye irrigants Murine Visine Murocel	None reported	Products containing polyvinyl alcohol	Gummy deposits on eye	Check expiration date Protect from light Don't touch dropper to eye or surrounding tissue

Drug	Side Effects	Interacts with	To Produce	Remember
Anti-infectives Combat Infection **Sulfacetamide** Sulamyd Isopto Cetamide	Pain Itching Burning	**Local anesthetics** Procaine Tetracaine	Decreased sulfacetamide action	Contraindicated in sulfonamide hypersensitivity Do not touch dropper to eye or surrounding tissue
Tetracycline HCL Achromycin Ophthalmic	Itching Dermatitis around eye	None significant		Watch for signs of sensitivity Do not touch dropper to eye or surrounding tissue
Anti-infective Combination Products **Neosporin Ophthalmic** (contains polymyxin, neomycin, and bacitracin)	Itching Burning Dermatitis	None significant		Watch for signs of sensitivity Do not touch dropper to eye or surrounding tissue
NeoDecadron (contains dexamethasone neomycin) **Neo-Polycin** (contains polymyxin neomycin gramicidin) **Neo-Cortex** (contains hydro-cortisone neomycin)				Contain anti-infective plus anti-inflammatory medications Do not touch dropper to eye Watch for signs of sensitivity